

Middle School Mechatronics/Robotics

Course Code: 21016

Rational Statement:

Robotics/Mechatronics exposes students to 21st century workplace skills and provides students with hands-on application of math and science concepts utilized in the real world.

Suggested Grade Level: 6-8

Topics Covered:

- Basic motor controls
- Solving Worldly Problems Using Robotics
- Basic Programming
- Mechanical systems
- Robotics and Entrepreneurship
- Career Possibilities

Core Technical Standards & Examples

Indicator 1: Understand the components that make up a robot	
Bloom's Taxonomy Level	Standard and Example
Understanding	MSMR1.1. Know the equipment used in robotics <i>Example:</i> <ul style="list-style-type: none"> • Identify types of sensors • Explain various functions of motors • Explain the role of a computer as a robotic control device
Understanding	MSMR1.2. Identify various mechanical systems used in robotics <i>Example:</i> <ul style="list-style-type: none"> • Describe a belt and pulley speed reduction system • Recognize the importance and application of mechanical advantages
Applying	MSMR1.3. Demonstrate the use of programming commands <i>Example:</i> <ul style="list-style-type: none"> • Compile a program to demonstrating a robotic “dance” • Develop a program to move the robot along a particular shape

Indicator 2: Investigate the impact of robotics on our society	
Bloom's Taxonomy Level	Standard and Example
Analyzing	MSMR2.1. Compare and contrast robotics labor vs. human labor <i>Example:</i> <ul style="list-style-type: none"> Explain the economic advantages/disadvantages of robotic labor Evaluate the decision of hiring 4 humans vs. 1 robot to do the same job
Understanding	MSMR2.2. Explore career outlook for robotic applications <i>Example:</i> <ul style="list-style-type: none"> Identify jobs that will be created/eliminated by robotics Brainstorm new robotics related careers
Understanding	MSMR2.3. Explore new entrepreneurial opportunities using robotics <i>Example:</i> <ul style="list-style-type: none"> Discuss a fictitious business venture utilizing robotic labor Identify a business that could be improved using a robotic system
Indicator 3: Design a robot to solve a particular problem	
Bloom's Taxonomy Level	Standard and Example
Applying	MSMR3.1. Identify robotic applications <i>Example:</i> <ul style="list-style-type: none"> In group discussion: consider the application of robotics Draw a robot and discusses the various differences in drawings
Applying	MSMR3.2. Propose a robotic design <i>Example:</i> <ul style="list-style-type: none"> Sketch a diagram of a robotic "disk jockey" Present an idea to the class of how a robot can make your quality of life better
Applying	MSMR3.3. Construct a robot <i>Example:</i> <ul style="list-style-type: none"> Build a Lego robot

	<ul style="list-style-type: none"> • Use an Erector set to construct a robot
Applying	MSMR3.4. Program a robot <i>Example:</i> <ul style="list-style-type: none"> • Write and download a program to make a robot navigate through a maze • Write a program to make a robot follow a black line
Applying	MSMR3.5. Evaluate robot programming <i>Example:</i> <ul style="list-style-type: none"> • Record data on the preciseness of a program • Analyze inconsistencies in the completion of a particular repetitive task